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10/661,031	09/12/2003	John A. Moon	CV-0039A	6760

7590 05/11/2005

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Wallingford, CT 06492

EXAMINER

LAVARIAS, ARNEL C

ART UNIT PAPER NUMBER

2872

DATE MAILED: 05/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/661,031

Applicant(s)

MOON ET AL.

Examiner

Amel C. Lavarias

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION:

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 3/7/05, 2/7/05, 11/19/04.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 20-155 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20-155 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/7/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings were received on 2/7/05. These drawings are acceptable.

Response to Amendment

2. The amendments to the specification of the disclosure in the submissions dated 2/7/05 and 3/7/05 are acknowledged and accepted. In view of these amendments, the objections to the specification in Section 10 of the Office Action dated 10/4/04 are respectfully withdrawn.
3. The amendments to Claims 20, 31, 58, 96, 116, and 136 in the submissions dated 2/7/05 and 3/7/05 are acknowledged and accepted. In view of these amendments, the objections to the claims in Section 11 of the Office Action dated 10/4/04 are respectfully withdrawn.

Response to Arguments

4. The Applicants' arguments, see in particular Pages 34-35 of Applicants' remarks, filed 2/7/05, with respect to the rejections of Claims 20, 58, 96, 116, and 136, have been fully considered and are persuasive. The rejections of Claims 20-155 in Sections 18-22 of the Office Action dated 10/4/04 have been withdrawn.
5. It is additionally noted that, based on the amendments made to Claims 20, 31, 58, 96, 116, and 136, the provisional rejections of Claims 20-155 under 35 U.S.C. 101 over

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copending Application No. 10/645686 in Section 14 of the Office Action dated 10/4/04 are respectfully withdrawn. However, the above amendments are very similar to the recent amendments made to the claims in copending Application Nos. 10/661254 and 10/661082, and hence the rejections of Claims 20-31, 40-41, 46-51, 53-69, 78-79, 84-89, 91-135 under obviousness-type double patenting over copending Application No. 10/661254 and the rejections of Claims 20-56, 58-94, 96-98, 114, 116-118, 134 under obviousness-type double patenting over copending Application No. 10/661082 in Sections 15-16 of the Office Action dated 10/4/04 have not been withdrawn.

6. Claims 20-155 are now rejected as follows.

Specification

7. The disclosure is objected to because of the following informalities:

Page 16, line 14- it is unclear what document is being cited here since no corresponding document is recited elsewhere in the specification or in a previously submitted information disclosure statement.

Appropriate correction is required.

Double Patenting

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

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A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 20-31, 40-41, 46-51, 53-69, 78-79, 84-89, 91-135 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 21-45 of copending Application No. 10/661254. Although the conflicting claims are not identical, they are not patentably distinct from each other because copending Application No. 10/661254 similarly recites an optical identification element, encoded particle, and associated methods for reading an optical identification element and encoded particle, as set forth in Claims 20-31, 40-41, 46-51, 53-69, 78-79, 84-89, 91-135 of the instant application. Further, it is noted that 1) 'a synthesized chemical' (See for example Claim 21 of copending Application No. 10/661254) is a subset of the generically recited 'chemical' of the instant application, 2) it would have been readily apparent and obvious to one having ordinary skill in the art for the surface of a particle to function in the same way as a substrate, and 3) it would have been readily apparent and obvious to one having ordinary skill in the art to perform the methods of reading the encoded optical identification element and encoded particle based on the recited structure provided for the optical identification element and encoded particle.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

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10. Claims 20-56, 58-94, 96-98, 114, 116-118, 134 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 24-60, 71-74 of copending Application No. 10/661082. Although the conflicting claims are not identical, they are not patentably distinct from each other because copending Application No. 10/661082 similarly recites an optical identification element, encoded particle, and associated methods for reading an optical identification element and encoded particle, as set forth in Claims 20-31, 40-41, 46-51, 53-69, 78-79, 84-89, 91-135 of the instant application. Further, it is noted that 1) the recited 'item' (See for example Claim 24 of copending Application No. 10/661082) generally corresponds to the chemical as recited in the instant application, and 2) it would have been readily apparent and obvious to one having ordinary skill in the art that in attaching the chemical to at least a portion of the substrate, one may view either the chemical being disposed on the substrate, or conversely the substrate being disposed on the chemical.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 20-23, 31, 44-45, 47, 49, 51-52, 54-55, 96-99, 104, 107, 109, 111, 113 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grot et al. (U.S. Patent No. 6005691), of record, in view of Baltes et al. (U.S. Patent No. 4537504).

Grot et al. discloses an optical identification element and method for reading an encoded optical identification element (See Figures 3A, 3B, 5A, 5B) having a chemical (See for example 117 in Figure 3B) attached thereto, the element and method both comprising a substrate (See 109 in Figure 3B); at least a portion of the substrate having at least one diffraction grating disposed therein (See 111 in Figure 3B), the grating having a resultant refractive index variation at a grating location (it is noted that features 111 appear as a variation of refractive index that alternates between the refractive index of substrate 109 and the refractive index of 117 when taken along a line parallel to the substrate surface, located in the plane of Figure 3B, and drawn bisecting the grating structure 111); and the grating providing an output optical signal indicative of a code (See 215, 221, 223 in Figure 5A; col. 8, line 23-col. 10, line 48) when illuminated by an incident light signal propagating in free space, the code identifying at least one of the element and the chemical (In the instant case, the code identifies the element), the output signal being a result of passive non-resonant scattering from the grating when illuminated by the incident light signal (See Figure 5A; In the instant case, the output signal is a result of conventional diffractive scattering from the diffraction grating); and the chemical being attached to at least a portion of the substrate. Grot et al. additionally discloses the refractive index variation comprising at least one or more refractive index pitches superimposed at a grating location (See 111 in Figure 3B); the substrate being made of

plastic (See col. 4, lines 32-47); the light source comprising one or more wavelengths (See col. 9, lines 59-65); the substrate having an end cross section geometry and a side view geometry that is rectangular (See Figure 3A); the substrate having a grating region where the grating is located and a non-grating region where the grating is not located at, and the substrate has a plurality of grating regions (See Figure 3A), the grating region having a refractive index not greater than that of the non-grating region (See col. 7, lines 50-57); the incident light being incident on the substrate at an angle to a longitudinal axis of the grating (See Figure 5A); the incident light comprising laser light (See col. 9, lines 59-65); and the substrate comprising a plurality of gratings each at different locations within the substrate (See Figure 3A). Grot et al. lacks the grating being embedded within a substantially single material of the optical substrate. However, it is quite well known and conventional to embed such diffractive grating structures within the associated substrate, the substrate being a substantially single material. For example, Baltes et al. teaches a similar, conventional security blank (See for example Figures 1-3) having at least one authenticating feature, such as a hologram or phase diffraction grating (See for example 2' in Figure 2), wherein such grating is embedded within the substrate, the substrate being a single material (See 3 in Figure 2; col. 4, line 46-col. 5, line 5). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the grating of the optical identification element and method for synthesizing a chemical on a substrate of Grot et al., be embedded within a substantially single material of the optical substrate, as taught by Baltes et al., for the

purpose of making the authenticating feature easily recognizable and verifiable, while making it difficult to forge or damage.

13. Claims 20-27, 29, 31-33, 35, 37-41, 43-65, 67, 69-71, 73, 75-79, 81-102, 104-122, 124-142, 144-155 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel (U.S. Patent No. 6096496), of record, in view of Ravkin et al. (U.S. Patent Application Publication US 2003/0129654 A1), of record.

Frankel discloses an optical identification element and particle and method for reading an encoded optical identification element and encoded particle (See Figures 1, 8-15, 17) having a chemical (See for example Figure 1B) attached thereto, both the element/particle and method comprising a substrate (See 190, 125, 160 in Figure 1A) such as a particle or bead; at least a portion of the substrate having at least one or more thin diffraction grating disposed therein (See for example 902a-f in Figure 9; 1003a-f in Figure 10; 1103a-f in Figure 11; 1204a-f in Figure 12; 1401a-e in Figure 14; 1506a-i in Figure 15) at different locations on the substrate, the grating having a resultant refractive index variation at a grating location (it is noted that features appear as a variation of refractive index that alternates between the refractive indices of the materials comprising the grating), the grating being embedded within a substantially single material of the optical substrate (See for example 125 in Figure 1A); and the grating providing an output optical signal indicative of a code (See 180 in Figure 1A; col. 11, line 44-col. 12, line 43) when illuminated by an incident light signal propagating in free space (See 170 in Figure 1A), the code identifying at least one of the element and the chemical (In the instant case, the code may identify either the element or the chemical); and the chemical being

attached to at least a portion of the substrate. Further, Frankel discloses a method for performing a multiplexed particle assay, comprising obtaining a plurality of particles each having at least one or more thin diffraction grating disposed therein at different locations on the substrate, the grating having a resultant refractive index variation at a grating location; attaching at least one probe to at least one of the particles, thereby providing functionalized particles; placing the functionalized particles in contact with at least one analyte, the analyte having a corresponding label disposed thereon; illuminating the particles with at least one incident light, the particle providing a first light signal indicative of a code and a second light signal indicative of the label; reading the first output light and detecting the code therefrom; and reading the second output light and detecting the label therefrom (See Figures 1A-B; 8-12; 14-15; 17-20). Frankel additionally discloses at least one or more refractive index pitches superimposed at a grating location (See for example Figures 9-12, 14-15, 17); the substrate being made of glass (See col. 11, lines 27-43); the code comprising a plurality of digital bits, numbering for example 4 or 20 (See col. 11, line 44-col. 12, line 43), each bit having a plurality of states, each bit having a corresponding spatial location and having a value related to the intensity of the output signal at the spatial location of each bit (See also Figures 1A-B; 9-12, 15-15, 17); the incident light comprising at least one or more wavelengths (See col. 15, lines 6-12; col. 32, lines 4-21; col. 32, line 66-col. 33, line 25) from for example a laser; the dimensions of the bead, and hence the substrate being less than 2 mm (See col. 6, lines 65-67); the substrate having a reflective coating disposed thereon (See for example 904a-f in Figure 9); the substrate having a coating disposed on at least a portion

of the substrate, at least a portion of the coating being made of a material, such as glass, plastic or polymer, that allows sufficient amount of incident light to pass through the material to allow detection of the code (See for example 125, 125' in Figures 1A-B; col. 13, lines 36-53); the substrate having protruding sections (See for example Figures 9-12; 17); the substrate having an end and side view geometry that is circular or elliptical (See for example Figures 1A-B); a portion of the substrate having a 3-D shape of a cube with unequal sides or a sphere with nonuniform diameter (See for example 160, 190 in Figures 1A-B); the substrate having a grating region where the grating is located and a non-grating region where the grating is not located (See for example Figures 9-12; 14-15; 17); the substrate having a plurality of grating regions (See for example Figures 9-12; 14-15; 17); the grating region having a refractive index that is greater than that of the non-grating region (See for example Figures 14-15; col. 26, lines 44-67; in this particular case, the refractive index of 1501 near the grating 1506a-f is greater than the refractive index of a region in 1502b far away from the grating); the grating region having a refractive index that is not greater than that of the non-grating region (See for example Figures 14-15; col. 26, lines 44-67; in this particular case, the refractive index of 1501 near and away from the grating 1506a-f are the same); the incident light being incident on the substrate along a longitudinal axis of the grating or at an angle to the longitudinal axis of the grating (See Figures 1, 9-12, 14-15, 17); and the chemical being for example an oligomer (See Figure 1B; col. 13, lines 7-53). Frankel lacks the output signal being a result of passive, non-resonant scattering from the grating when illuminated by the incident light signal. However, Ravkin et al. teaches a similar, conventional system for

multiplexed analysis of biological samples using coded particles (See for example Figures 33-51), wherein, instead of utilizing an active device coupled to the diffraction grating to generate a coded signal when an input light is provided, the coded particles include the diffraction grating without active devices such that light incident on the coded particles is diffractively scattered toward a remotely located detection system (See for example Figures 33, 51). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the output signal in the optical identification element and method of synthesizing a chemical on a substrate of Frankel, be a result of passive, non-resonant scattering, such as diffractive scattering, from the grating when illuminated by the incident light signal, as taught by Ravkin et al., for the purpose of reducing the size, weight, and complexity of the coded particles, since the additional elements and circuitry required for the active devices are no longer needed.

14. Claims 28, 30, 34, 36, 66, 68, 72, 74, 103, 123, and 143 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel in view of Ravkin et al.

Frankel in view of Ravkin et al. discloses the invention as set forth above in Claims 20, 58, 96, 116, and 136, but does not specifically disclose the value of each bit corresponding to presence or absence of a corresponding refractive index pitch in the grating, and hence the value of each bit corresponding to the magnitude of refractive index variation of a corresponding refractive index pitch in the grating. However, Frankel does further teach that the presence or absence of a particular spectral color determines whether a particular bit in the code has a '1' or '0', corresponding to presence or absence of the spectral color respectively (See col. 11, line 62-col. 12, line 31). Since

each bit is represented by a particular emitter structure (with associated grating(s)), it would have been a logical and obvious matter to one of ordinary skill in the art not have present a particular emitter structure (and its associated grating(s)) if that particular bit will always be '0'. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the optical identification element and particle and method for reading an encoded optical identification element and encoded particle of Frankel in view of Ravkin et al. further include the value of each bit corresponding to presence or absence of a corresponding refractive index pitch in the grating, and hence the value of each bit corresponding to the magnitude of refractive index variation of a corresponding refractive index pitch in the grating, such as by permanently removing, or not including, a particular emitter or set of emitters (and their associated grating(s)) for those bits that will always be a particular value, namely '0'. One would have been motivated to do this to reduce the complexity, cost, construction, and size of the resultant optical identification element/particle.

15. Claims 42 and 80 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frankel in view of Ravkin et al. as applied to claims 20 and 58 above, and further in view of Yguerabide et al. (U.S. Patent No. 6214560), of record.

Frankel in view of Ravkin et al. discloses the invention as set forth above in Claims 20 and 58, except for the substrate having a magnetic or electric charge polarization. However, constructing the bead out of a material having a magnetic or electric charge polarization is well known in the art. For example, Yguerabide et al. teaches a method and apparatus for detecting one or more analytes by detecting the light scattered from the

particles after the analytes have associated with the particles (See for example Abstract; Figures 21-24, 28-30). In particular, the particles are made of a material having electric or magnetic polarization to allow them to be oriented in the presence of an applied electric or magnetic field (See col. 12, lines 5-43; col. 40, lines 44-65; col. 88, line 24-col. 89, liner 20). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the substrate having a magnetic or electric charge polarization, as taught by Yguerabide et al., in the optical identification element and particle of Frankel in view of Ravkin et al., for the purpose of facilitating or optimizing readout of the codes in the element/particle by proper alignment of the element/particle.

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the

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advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arnel C. Lavarias whose telephone number is 571-272-2315. The examiner can normally be reached on M-F 9:30 AM - 6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

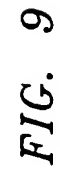
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Arnel C. Lavarias
5/6/05



THONG NGUYEN
PRIMARY EXAMINER
GROUP 2500



Drawing Changes
Approved
AK
5/6/05

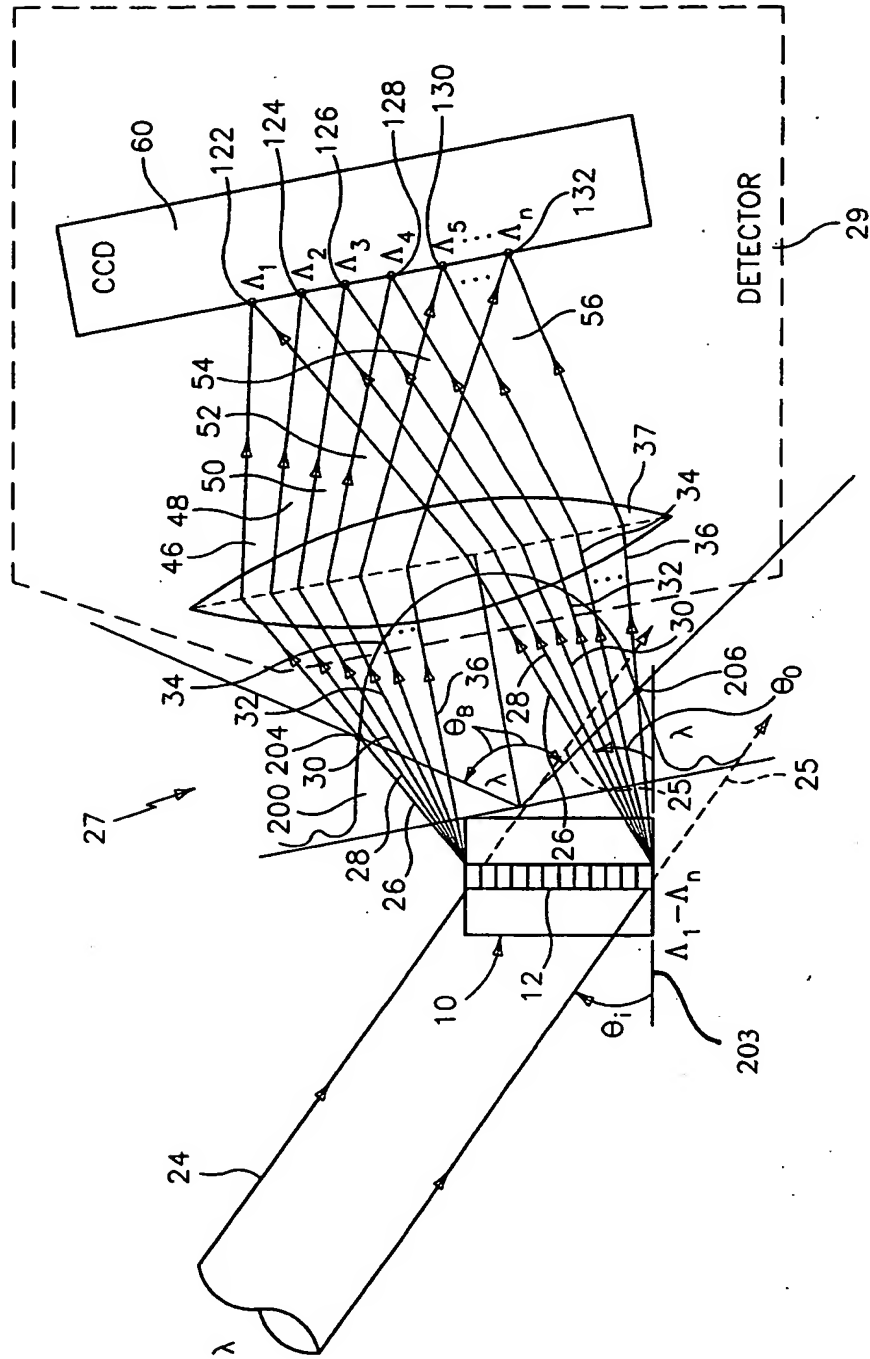
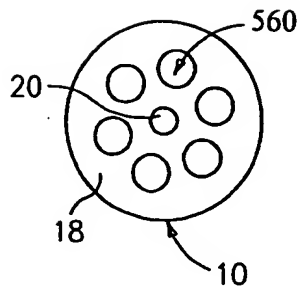
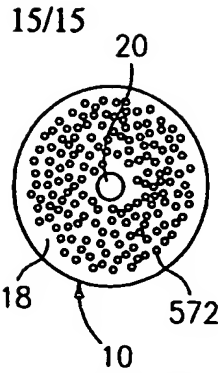


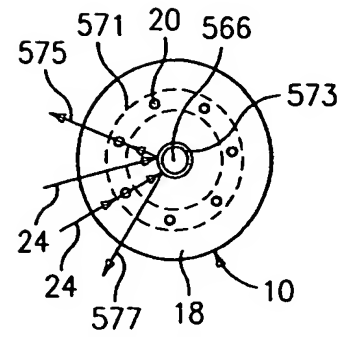
FIG. 10



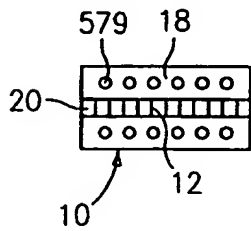
Illustration(a)



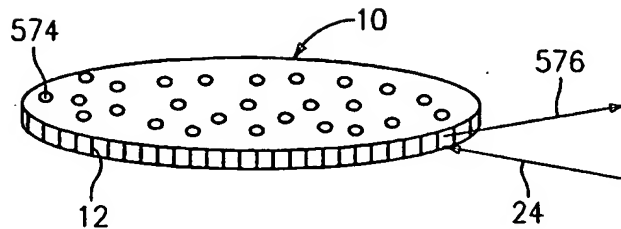
Illustration(b)



Illustration(c)

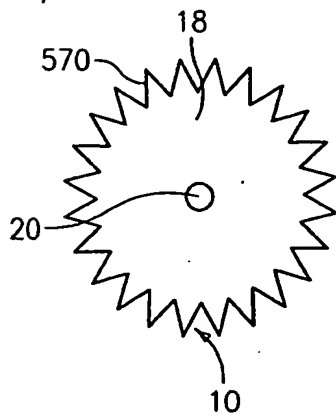


Illustration(d)

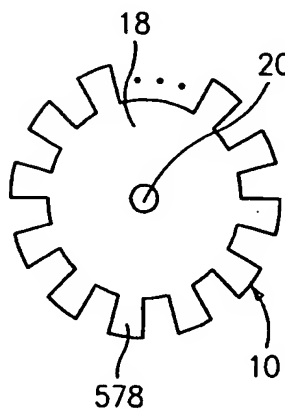


Illustration(e)

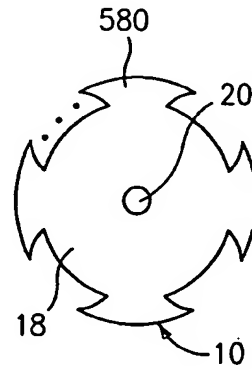
FIG. 33



Illustration(a)

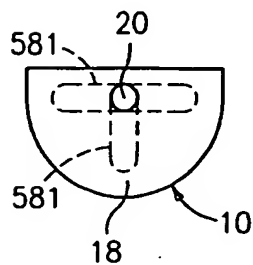


Illustration(b)

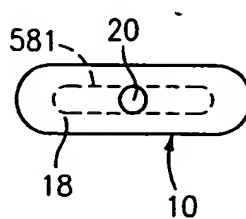


Illustration(c)

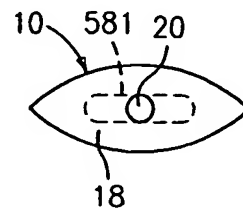
FIG. 34



Illustration(a)



Illustration(b)



Illustration(c)

FIG. 35